REMARKS

Entry of this amendment and reconsideration of this application as so amended is requested. By this amendment Applicant has corrected an obvious typographical error at page 4, line 4 of the specification and amended claim 1 for clarity by conforming the language to that used in the specification. Claim 1 remains in the case.

The Examiner has maintained the rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Lindemann in view of Riley et al ("Riley"). The Examiner in response to Applicant's prior arguments states that Riley and Lindemann both disclose systems and methods for measuring frequency responses of sinusoids, and thus are both in the same field of endeavor. The Examiner states that the motivation to combine the references is taught by Riley which specifically discloses "a method of frequency response measurement (col. 1, lls. 60-61) comprising the step of: thresholding the complex correlation magnitude signal (col. 17, lls. 40-42) as a function of a percentage of a maximum complex (col. 18, lls. 5-8) correlation magnitude" for the purpose of "measuring the frequency response with high accuracy (col. 8, lls, 29-31) given that the waveform distorting properties and the threshold setting of the measurement system are stable (col. 18, lls. 10-14)". Applicant respectfully traverses this improper and nonobvious combination suggested by the Examiner.

Applicant's claimed invention is a method of frequency response measurement for burst sinusoid or swept sinusoid signals, such as used in the video industry and illustrated in Fig. 1. A windowed complex sinusoid is created at a particular frequency (steps 12, 14), i.e., a fundamental sinusoid (sin( )) and a 90 degree out-of-phase sinusoid (cos( )) at the particular frequency. A window size used to create the windowed complex sinusoid is a function of the particular frequency, i.e., a function of a

sample rate divided by the particular frequency times a multiplier. The window size determines a window factor that is used to compute the windowed complex sinusoid. The windowed complex sinusoid is correlated with an input sinusoidal test signal (multi-burst or swept frequency) to produce a complex correlation magnitude signal (steps 16-20). The complex correlation magnitude signal is thresholded as a function of a percentage of a maximum value for the complex correlation magnitude signal. A centroid for the thresholded complex correlation magnitude signal is found, and the magnitude of the thresholded complex correlation magnitude signal at the centroid determines, i.e., is a measure of, the frequency response at the particular frequency. Applicant has amended claim 1 for clarity to conform to the language in the specification, i.e., "windowed complex sinusoid" is correlated with the input signal to produce the complex correlation magnitude signal (page 4, lines 15-18) and the magnitude of the complex correlation magnitude signal is used to determine the maximum value and the frequency response at the centroid (page 4, line 21 - page 5, line 4). Applicant submits that such amendment does not change the substance or scope of claim 1 as originally presented.

In contradistinction to Applicant's claimed invention Lindemann teaches a hybrid synthesis approach to encoding and synthesizing a tonal audio signal (sum of sinusoids) by (a) determining the parameters of a few dominant sinusoidal components of the tonal audio signal which are subsequently synthesized using full time-domain sinusoidal additive synthesis, and (b) determining the residual sinusoids in the tonal audio signal which are subsequently synthesized using a less optimal synthesis method such as pulse-based LPC or VQ coding. There is no frequency response measurement performed by Lindemann as Lindemann merely determines the parameters of the most dominant sinusoids within the tonal audio signal during the

encoding and does not correlate the tonal audio signal with a windowed complex sinusoid at a particular frequency.

* The Examiner states that Lindemann teaches a method of frequency response measurement. Lindemann teaches a hybrid encoding and synthesis process for a tonal audio signal and not a method of frequency response measurement.

* The Examiner states that Lindemann teaches creating a complex sinusoid window at a particular frequency, referring to the tapered window used in determining a frame of the tonal audio signal. Applicant has clarified claim 1 to conform to the wording in the specification to indicate that what is created is a windowed complex sinusoid, which is not taught or suggested by Lindemann.

* The Examiner states that Lindemann teaches correlating an input sinusoidal test signal with the windowed complex sinusoid to produce a complex magnitude signal, referring to the statement that the dominant sinusoid parameter sequence is input to a sinusoidal oscillator bank and that the FFT of the windowed data frame provides a magnitude spectrum. However claim 1 recites that the correlation is between the windowed complex sinusoid and the input signal. Lindemann does not teach or suggest any such correlation of the tonal audio signal with a windowed complex sinusoid, which is necessary to find within the input signal the frequency for which the frequency response is to be measured. Further Lindemann does not produce a complex magnitude signal, but a magnitude spectrum, i.e., a frequency domain attribute, not a time domain attribute.

* The Examiner states that Lindemann teaches finding a centroid of the complex correlation magnitude signal, referring to the statement that a cepstrum function is created using an iFFT, which cepstrum function is windowed by a rectangular window to zero the cepstrum function everywhere but about a center point. It is noted that this refers to the processing of the residual tonal audio signal, i.e., the VQ coding, and is

unrelated to the dominant sinusoid processing previously under discussion. Applicant submits that this is not equivalent to finding a centroid of a complex correlation magnitude signal formed by the correlation of a windowed complex sinusoid at a particular frequency with the input signal.

* Finally the Examiner states that Lindemann teaches determining the frequency response at the particular frequency as the magnitude of the complex correlation magnitude signal at the centroid, referring to the statement that the indices of those FFT bins whose center frequencies are closest to integer multiples of f0, i.e., harmonic bins, having the greatest magnitude are used to set the dominant sinusoid parameter sequence values. There is no centroid here, i.e., no cepstrum function, so the Examiner is inconsistent. Applicant submits that Lindemann does not teach or suggest finding a magnitude of the complex correlation magnitude signal at the centroid to determine the frequency response at the particular frequency as recited in claim 1.

The Examiner admits that Lindemann does not teach a method of frequency response measurement including the step of thresholding the complex correlation magnitude signal as a function of a percentage of a maximum value for the complex correlation magnitude signal, but asserts that Riley teaches a method of frequency response measurement ("improving the accuracy of frequency response measurements of linear systems") including the step of thresholding the complex correlation magnitude signal ("a voltage threshold is set for the comparator halfway between the upper and lower states of the waveform" – the square wave) as a function of a percentage of the maximum value of the complex correlation magnitude signal ("the threshold value is adjusted for the signal or diffraction grating proven by spectrum analysis to have a 50% duty cycle"). There is no adjustment as a percentage of a maximum value of a signal as recited in claim 1.

Riley teaches using modulation transfer function test compensation where an optical imaging system illuminates and images an input test pattern, and a processor measures the modulation transfer function and determines a compensating factor for error in the input test pattern duty cycle. In other words Riley teaches how to adjust amplitude values of the odd harmonics generated by a windowed FFT for the test pattern to correct the error in resolution target duty cycle, i.e., Riley does not teach frequency response measurement. Since, contrary to the Examiner's assertion, neither Riley nor Lindemann teach measuring frequency response, there is no reason one of ordinary skill in the art would combine the teachings of these references. Further there is no reason why one of ordinary skill in the art would use some thresholding in Lindemann for any reason whatsoever. Therefore there is no reasonable way that the teachings of Riley could be incorporated in Lindemann to produce the invention as recited by Applicant in claim 1.

In view of the foregoing amendment and remarks entry of this amendment and allowance of claim 1 are urged, and such action and the issuance of this case are requested. Should the Examiner maintain the rejection of claim 1, entry of this amendment is requested as placing the case in better form for appeal by providing a clearer version of claim 1.

Respectfully submitted,

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